A comparison of student feedback obtained through paper-based and web-based surveys of faculty teaching

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Abstract
Many colleges have either begun or are contemplating using the web-based survey to gather student feedback on faculty teaching. Unlike the paper-based method, the web-based approach gives every student in the class the opportunity to provide feedback. Hence, the populations that participate in the web-based and paper-based methods may be quite different, and so may be the feedback. This paper compares the results of student feedback gathered through paper-based and web-based approaches. The results provide information to faculty and administrators on any differences they may expect as they make the transition from a paper-based to a web-based survey of faculty teaching.

Introduction
Student surveys have long been the instrument of choice used by universities to collect student feedback on the effectiveness of courses and classroom delivery. Most institutions have spent significant resources to design, calibrate and analyse such instruments. The goal has been to elicit information useful in the revision of course contents and delivery methods and as an important input in the evaluation of the teaching performance of individual faculty.
Traditionally, universities have used printed survey instruments as the primary mechanism to collect student feedback. Currently there is an increasing number of universities that administer surveys on the Web to reduce costs while increasing operational efficiency. Also, conducting surveys online seems appropriate because of the increase in accessibility and convenience of using the Internet by students. Given the importance of student feedback as an input in course improvement and the evaluation of faculty teaching, a careful analysis and understanding of all of the differences in evaluation outcomes of paper-based and web-based surveys is necessary. This paper presents the first published large-scale study that statistically compares the results of both quantitative and qualitative sections of student feedback of faculty teaching using the web-based and paper-based methods. This paper empirically tests several theories that are made by some authors about the differences in student responses and behaviours in the two methods. In addition, this paper addresses some questions that have not been dealt with in the literature.

**Background**

Traditionally, universities have used paper-and-pencil surveys to collect student feedback. Normally, a portion of a regular lecture session is devoted to the distribution, completion and collection of the paper-based surveys. Whether the class sessions in which these surveys are conducted are announced or not, the sample gathered depends on the class attendance for that single session. These printed instruments are typically a mixture of scaled, closed-ended and open-ended questions. The responses to closed-ended questions can be quickly recorded using widely available scanning technology; this set of scaled responses would then be processed as *quantitative feedback*. The open-ended questions, such as ‘Please comment on this course’ and the semi-open-ended questions, such as ‘What was the most important topic covered in the course?’ would elicit written comments from the students. These comments would require manual transcription to provide readability for this handwritten material and, more important, to provide anonymity for the student respondents. This set of comments would then be assembled as *qualitative feedback*. The processing of this qualitative feedback, requiring transcription, is one of the major disadvantages of this method, because it is expensive, time-consuming and prone to error.

Currently, several colleges are administering web-based student surveys to gather student feedback. Typically, the administrative staff makes the instrument available to all those students who are officially registered for the course. The authorisation mechanisms used for online registration or student email accounts provide adequate access control. Further, a suitable survey availability window is opened encompassing the last week of classes before the final examination period. There are a number of venues for the advertisement of the survey response window, including e-mails, announcements in class, semester calendars and Blackboard announcements. This greatly increases the opportunity of the student to participate in the survey. Of course, the web-based method may well introduce its own type of response bias to the sample. For example, the web-based method surely increases the likelihood that a student with poor attendance, who might miss the paper-based survey, will participate in the online survey.

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As will be shown in the review of literature related to student surveys of faculty teaching, the web-based survey is cheaper to conduct, and its results are easier to compile. Even a medium-size institution with a large number of surveys to conduct realises huge cost savings by converting its paper-based surveys to the web-based method. With the infrastructure for online registration, web-based courses and interactive media becoming ubiquitous in higher education, the marginal cost savings above the sunk costs of existing infrastructure are even more significant.

There may be other inherent differences between the two methods. The effects of these differences on the results of the feedback must be evaluated carefully as colleges make the transition from paper-based to web-based systems. The two methods may entail differences in:

1. **Level of participation** and the response rates for the two methods;
2. **Survey cycle time**, which represents the total time from the initiation of the survey until the results have been made available for faculty and departments;
3. **Integrity of feedback** and the degree to which the results accurately reflect the responses by the students;
4. **Anonymity** and the degree to which the respondents feel confident in the anonymity of their responses;
5. **Amount and quality of feedback**: the length of comments made by the students and the number of specific issues raised in their comments; and
6. **Administrative costs**.

The following section discusses these differences and reviews the current literature on these issues.

**Differences between paper-based and web-based methods**

Although the same survey instrument is used in the two methods, the environments in which students provide feedback are quite different. The changes in the environments may result in different student behaviours and therefore differences in the feedback they provide. The different environments and the expected results are reviewed in the following sections.

**Accessibility**

The survey of teaching is usually administered at the end of the term, before the final examinations. The availability of the survey instrument online provides students with a greater opportunity to complete the survey at their convenience and when they have access to the Web (Handwerk, Carson & Blackwell, 2000). All of the students in the class have equal access to the web-based survey. None of the students lose this opportunity because of being absent from class as they do when the instructor administers the paper-based survey.

**Revision and frequency**

The web-based approach offers a distinct advantage when the institution wants the flexibility of using different survey questions for different courses. The online survey
instruments can be revised and modified with relative ease. Researchers have documented the advantages of this method where course-specific survey instruments are needed to determine the achievement of learning goals (McGourty, Scoles & Thorpe, 2002). These researchers report that Columbia University makes survey results available to students to help them select the faculty whose teaching methods best match students’ learning styles.

**Reduced survey cycle time**
Because the web-based method requires a very small number of steps that need significant human intervention, the results become available faster, providing the opportunity to administer surveys more frequently during the term. The great advantage is that the results from interim surveys can be used to modify the course materials and teaching methods while the course is in progress (Hmieleski & Champagne, 2000).

**Response rate**
A major concern with the web-based approach is the possibility of low response rates and unmeasurable nonresponse bias. Cummings and Ballatyne (1999) and Hmieleski (2000) indicate lower response rates for the web-based approach compared with the paper-based approach. Hmieleski and Champagne (2000) reported on an Interactive and Distance Education Assessment Laboratory survey of the United States’ 200 most wired campuses. They state that out of the 105 responding institutions, 67% indicated a return rate of 70% or more for paper-based surveys and the remaining institutions indicated return rates of 20 to over 90% for web-based surveys. McGourty et al (2002) and Thorpe (2002) report that student sex, class standing and cumulative GPA are good predictors of student participation in the course survey process. They state that female students completed a higher percentage of the surveys than male students.

**Integrity of feedback**
Under the web-based method, the system authenticates the students using the same authentication mechanisms as those used for university emails or online registrations. The authentication is necessary to ensure that each student provides feedback only once, and those students who are properly registered in that particular section can provide feedback for each course section. The web-based approach guarantees feedback integrity at the same level as the authentication and authorisation mechanisms of the institution’s registration system.

**Anonymity**
Unfortunately, the web-based authentication process for survey access inevitably enables the system to trace students to their feedback and report on information each student has provided, raising student concerns about the lack of anonymity. Results of a study conducted by Recker and Greenwood (1995) state that many students felt that the web-based method was not completely able to preserve their anonymity. A perceived lack of anonymity in the use of some email surveys has also been suggested as a reason for low response rates (Kittleson, 1995; Moss & Hendry, 2002;
Ranchhod & Zhou, 2001). Hmieleski and Champagne (2000) state that some students may give insincerely positive comments because they lack confidence in the anonymity of their responses.

Paper-based surveys require formal authentication. Authentication is inherent in paper-based methods because they are administered in classrooms and under faculty supervision. However, one response per student cannot be guaranteed, especially in larger classes, and confidentiality depends on the honesty of the classmates sitting close by (Recker and Greenwood, 1995).

**Time spent on providing feedback**
Most often, instructors administer paper-based surveys at the end of the class time. In some cases, the time allowed to complete the surveys is short, and in some other cases students may be in a hurry to leave the class. Several authors believe that this approach does not allow students to provide thoughtful feedback (Handwerk et al, 2000; Hmieleski & Champagne, 2000). Also, most students are now accustomed to writing using computers. Completing the surveys on computers provides a medium for writing that students are more accustomed to. McGourty et al (2002) state that there was an increase in the number of comments at Colombia University as a result of the change to a web-based approach.

**Length and quality of feedback**
The literature contains both positive and negative statements about the effect of conducting teaching evaluations online on the length and quality of feedback. Hmieleski and Champagne (2000) report that students who used a web-based survey to evaluate a management course wrote four times as many comments as students who used a paper-based survey. Also, Handwerk et al (2000) note that the web-based approach results in a more detailed and more thoughtful feedback by students. Hmieleski and Champagne (2000) agree with this statement, especially when the web-based approach is used during the course for feedback and refinement. However, they state that some authors believe that students may make insincerely negative or reckless remarks because of environmental distractions present while students provide feedback.

Theall (2000) states that although in a web-based approach students can respond at their leisure, their responses may be unreliable because of the absence of any control over the environment in which they fill out the surveys and the presence of other individuals who may influence their responses. He argues that web-based evaluation surveys cannot guarantee a higher level of feedback quality than a paper-based approach and may actually be less reliable and may have lower validity because their characteristics have not been thoroughly studied.

Thorpe (2002) studied the difference between the ratings of 23 response items for selected sections of courses in computer science, mathematics and statistics. For each course, a pair of sections was chosen: one section of each course used a web-based survey, while the other section used a paper-based survey of the same instrument.

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Statistically significant differences were found in ratings between the two methods in three items for the computer science course, in two items for the mathematics course and in only one item for the statistics course. In each of these three courses, the few survey items that did show a significant difference provided higher ratings for the web-based surveyed sections than for the paper-based surveyed sections.

Liegle and McDonald (2005) report no differences in student ratings of instructor effectiveness between the two methods. Recker and Greenwood (1995) also conducted a small study to compare the differences in ratings in faculty evaluations using web-based and paper-based methods. Their results indicated that, except for a single question, there were no statistically significant differences in student ratings between the two methods. Again, the student ratings were slightly higher in the web-based method than in the paper-based method for that single question.

A slightly different type of comparison was made by Handwerk et al (2000), who conducted a study in which college students ranked the reasons for having chosen their particular college. The students also reported whether they would or would not have made the same choice at the time of the survey. The results showed that students using the web-based method were more satisfied with their choice of college. Also, Carini, Hayek, Kuh, Kennedy and Ouimet (2003) conducted a large-scale study using the National Survey of Student Engagement to compare students’ ratings of the degree to which they participate in effective education practices. They concluded that ratings by students who completed the web-based surveys were slightly higher than ratings provided by students who completed the paper version of the survey.

**Administrative costs**

Several authors support administering student surveys on the Web, citing lower costs as the main benefits. The paper-based approach is a labour-intensive process. A typical survey cycle begins with the departmental staff placing orders for survey forms for every course section. The office responsible for printing the forms sends them to the departments once the forms become ready. Upon receipt of the forms, the departmental staff prepares packets for each course section and delivers the packets to the faculty. The faculty members take the surveys to their classes and have either students in the class or departmental staff members administer the surveys. Once the surveys are returned to the department, the numerical and comments sections are separated. The staff sends the scaled responses to the computer centre for scanning and processing. For the qualitative feedback, the staff must either type the comments or send them to an external agency for typing. Upon receipt of the results from the computer centre and the typist, the staff matches the scaled and qualitative results for each course section and delivers the results to the faculty. Copies of these documents are included in appropriate departmental files.

The web-based approach may have a large, one-time development cost, but it has relatively low operational costs. For institutions with existing systems for online registration and student email, even this development cost may be mitigated by the use of
existing survey infrastructure. The computer centre staff develops the processes for conducting the surveys, collecting and organising the results, storing the results, and distributing the results to the appropriate individuals. All of the routing, matching and filing processes are handled automatically in electronic format. Once established, this process requires little or no human intervention.

Kronholm, Wisher, Curnow and Poker (1999) conducted a comprehensive study of the total costs of production, distribution, monitoring, scanning and analysis for both paper-based and web-based student surveys of a distance-learning course. The instruments had 22 questions. There were 327 students enrolled in the course across 18 sites. The total cost for the paper-based survey was determined to be $586.60 while the cost for the web-based survey was only $18.75. The study assumed a labour cost of $15 per hour. It is reasonable to assume that over time, the cost of the labour-intensive paper-based method will continue to rise relative to the web-based method.

The web-based approach facilitates the transfer of data to data warehouses. Results for a series of terms are stored in one place and are easy to access and manipulate. These data can then be used efficiently to conduct trend analysis. They can also be used to compare student achievement of learning goals with respect to changes in the curriculum or teaching methods (McGourty et al., 2002).

**Comparisons of feedback results**
The literature on comparing feedback results between the two methods is limited and the few articles that are available are based either on studies conducted with small samples or on intuitive conclusions that have not been formally examined. In addition, the formal test results reported in the current literature are related only to the quantitative portion of teaching surveys. This paper fills these two major gaps in the literature on comparing feedback from web-based and paper-based methods by empirically testing the untested theories by other authors and formally testing the results of both quantitative and qualitative sections of student surveys. In addition, this paper considers several important questions that have not been addressed in the literature. Specifically, this paper includes questions related to the differences in the results of the two systems for faculty who were ranked below or above the departmental average in the paper-based method, response rate and length of qualitative responses, and meaningfulness and thoughtfulness of qualitative responses. Another major contribution of this paper is proposing definitions that help in quantifying qualitative feedback so that formal statistical analysis could be performed on them.

This section discusses the methodology and the data used by this study and is followed by sections on the results and conclusions.

**Methodology**
The survey of faculty teaching at Old Dominion University was moved from paper-based to online in fall of 2003. The surveys were made available to students on a site that was
different from the university’s learning management system to ensure anonymity of respondents and remove any doubts about the possibility of faculty determining the respondents’ identity. Staff sent students emails giving them instructions regarding the time window and the procedures for completing the surveys. Faculty were also notified and were asked to announce the availability of the surveys in their classes and to encourage students to participate in the process. Neither the paper-based nor the web-based methods used in this study offered any incentives to students for completing the surveys.

The survey instrument itself remained unchanged (Appendices 1 and 2) when the venue was moved to the Web. The questions posed to students in the web-based method were exactly the same as those used in the paper-based survey. The quantitative section included eight questions. Students responded by rating each of the items of course and faculty effectiveness on a Likert scale, from 1 representing poor to 6 representing excellent. In addition, there was a not applicable option for students who did not want to respond to a question. The qualitative section was an open-ended comment section in which students could provide their observations on any aspect of the course.

This study used student survey data from the College of Business and Public Administration. Because of the nature of the research and the confidentiality of the data, permission to conduct this research was obtained from both the Dean of the College of Business and Public Administration and the Vice President for Academic Affairs. These permissions were in addition to the university’s normal human subjects protocol. Because of the sensitivity of the material, a requirement was set that the course survey data come only from the tenured and full-time tenure-ineligible faculty who authorised that their course survey data be included in the research. The university also required that the college’s associate dean remove all of the information that could be used to identify a department, a course or any personal characteristics of an individual professor before continuing with this research.

Because of the initial inevitable procedural and technical problems with the process, it was decided to omit the results of fall 2003, the first semester’s results. Web-based survey results from the following semester, spring 2004, were used and compared with the paper-based survey results from spring 2003. An advantage in using data from the two spring semesters is the similarity in course offerings and numbers of sections between spring semesters. Paired section data were obtained, using the results for the same courses that were taught by the same faculty in the two semesters. Ninety-two sections, consisting of 46 section pairs, of a variety of required and elective courses at the undergraduate and graduate levels were included. The average enrolment in these classes was approximately 30 in spring 2003 and 28 in spring 2004. The total number of students enrolled in the 46 classes in spring 2003 was 1415, of which 972 provided feedback. The total number of students enrolled in the 46 classes in spring 2004 was 1276, of which 392 provided feedback (Table 1). There were no significant demographic shifts overall for the college in terms of age, gender or academic progress between the two semesters.
Hypotheses
Student feedback was used to test several hypotheses to determine whether there were statistically significant differences between the paper-based and web-based methods. This section presents the description of the hypotheses tested. The next section presents the tests conducted and their results.

The first hypothesis considered response rate. The literature on response rates in faculty teaching surveys contains hypotheses that are not supported by formal studies. In addition, there is no consensus as to whether the response rate increases or decreases as a result of a change from paper-based to web-based method. Students included in this study were not coerced to complete the survey in either method, especially because faculty were not present while students were responding to the surveys. Students were free to decline completing the surveys in either of the two methods.

The first hypothesis considered the equality of response rates between the two methods. Specifically, the equality of the percentage of the total number of respondents in each semester out of the total enrolments was considered. The substitution of the actual number of responses with the percentage of the number of responses to total enrolment was made to reduce the effect of unequal total enrolments in the two semesters.

The second hypothesis considered the equality of student ratings of faculty teaching for the eight quantitative questions. The equality test was therefore conducted for each of the eight questions. As mentioned before, the previous and limited studies of this question had indicated little difference in the results between the two methods.

The third hypothesis considered the equality of student ratings between the two methods for faculty who were rated above the college average when the paper-based method was used. This test was conducted for one of the eight quantitative questions asking students to rate the overall effectiveness of the instructor. This test determined whether there was a statistically significant change in student ratings for faculty who were rated above the college average in the paper-based method.

The principal impetus for the third hypothesis stemmed from concern among some faculty that making the surveys available on the Web would give students who have not attended the class regularly and, therefore, may not be qualified to provide accurate feedback, the opportunity to do so. Faculty expected these students to rate them lower.
than those students who attended the class regularly. Also, several faculty suggested that some of the students who attended the class regularly and were therefore highly qualified to rate faculty teaching performance may not take the time to provide feedback on the Web. Faculty who were rated above the college mean were concerned that these factors would result in a decrease in their ratings in the web-based method.

The fourth hypothesis is similar to the third hypothesis, except that it considered the equality of student ratings between the two methods for faculty who were rated below the college average when the paper-based method was used. This test was also conducted for the same quantitative question that asked students to rate the overall effectiveness of the faculty.

As was revealed by the review of literature, several authors have made predictions about students’ responses to the qualitative section of the survey of teaching in the web-based environment, but have not formally tested their hypotheses. The qualitative section of the survey is an open-ended question that gives students the opportunity to discuss the strengths and weaknesses of faculty teaching and provide suggestions on how faculty may improve their teaching. Hypotheses 5 through 10 explore the existence of any differences in students’ qualitative responses between the two methods.

The fifth hypothesis considered the equality of the ratio of the number of students who provided a qualitative response to the number of students who completed the quantitative portion of the survey between the two methods. Students who provided any feedback at all always completed the quantitative section of the survey. However, only a portion of these students provided any qualitative comments. The purpose of this test was to determine if the web-based environment would increase students’ tendency to give qualitative responses.

The sixth hypothesis tested the equality of the number of students who gave a positive, mixed or negative response between the two methods. Each student’s qualitative response was categorised as one of these three—positive, mixed or negative. For example, if a student made one or more positive comments and no negative comments about a faculty member, the response as a whole was categorised as positive. The purpose of this test was to determine whether making the survey available to all students on the Web, including those students who frequently missed classes, would significantly change the overall response mix. The comments were independently double-checked by the researchers for accuracy in classification.

The seventh hypothesis considered the equality of the length of comments made by students between the two methods. The length of each student’s comment was measured as the total word count of the response. The literature predicts longer comments in a web-based method because there is no practical time limit on how long students take to complete the survey and because students have supposedly chosen a convenient time and location to complete the survey.
The eighth hypothesis considered the equality of the ratio of the number of students who provided a constructive response to the number of students who provided a response between the two methods. A response is constructive if it includes one or more constructive comments. Although comments such as ‘This was an excellent professor’ are very positive, they neither have any explanatory value nor do they show evidence of any critical analysis. Such comments were classified as nonconstructive. On the contrary, comments such as ‘The professor gave real-life examples to communicate complex concepts well’, or ‘The professor did not return the tests in a timely manner’ refer to specific techniques the faculty may use to improve student learning. These types of comments were classified as constructive. This paper used this classification as a surrogate for thoughtfulness of students’ responses. A constructive response is considered a thoughtful response because it shows critical analysis of the course delivery and offers one or more suggestions for ways to improve the course. The goal of this hypothesis was to test the validity of the belief by some authors that students provide more thoughtful comments in the web-based method.

Hypothesis 9 considered the equality of the number of constructive comments in each student response between the two methods. The same definition was used to determine if a comment was constructive. For example, the last two comments in the following student response are constructive. ‘This was an excellent professor. She gave real-life examples to communicate complex concepts well. She answered every question well’. The purpose of this test was to consider the assertion found in the literature that students would provide more thoughtful comments.

Finally, the tenth hypothesis considered the equality of the ratios of number of constructive comments and the number of constructive comments that were qualified by students between the two methods. This paper defines a qualified constructive comment as those constructive comments for which students give a supporting rationale or reason. For example, the comment ‘I appreciated the professor bringing back graded tests quickly’ was categorised as a constructive comment, while the comment ‘I appreciated the professor bringing back graded tests quickly. This improved my learning because the material was still fresh in my mind’ was categorised as a qualified constructive comment.

The authors believe that in most cases constructive and qualified constructive comments have similar operational qualities. Both of these types of comments provide feedback on techniques faculty should employ to improve student learning, and as defined before, both are considered thoughtful. However, given more time and convenience provided by the web-based method, students may be more inclined to provide reasons for their suggestions online, resulting in clearer and more meaningful feedback. We used qualified constructive comments as a surrogate for meaningful comments. Therefore, the purpose of this test was to determine if there were any differences among the clarity/meaningfulness of responses between the two methods.
Results

Hypothesis 1: response rate
The chi-square test was used to test the first hypothesis. The results indicate that there is a statistically significant difference ($p < 0.0001$) between the ratio of the number of students who provided feedback to the number of students enrolled in classes between the two methods. A significantly larger number of students provided feedback when the paper-based method was used. This result confirms conclusions reported several times in the literature. Table 2 summarises the results of the test of all of the hypotheses.

Hypothesis 2: quantitative ratings
Eight $t$-tests were conducted, one for each of the eight quantitative questions, to determine whether students’ ratings of faculty teaching were different in the two methods. None of the eight $t$-tests showed a significant difference between student ratings in the two methods. The values of the differences in the mean ratings were relatively very small, ranging from 0.017 to 0.07. The direction of change was not consistent among the eight questions, indicating no consistent change for a particular method.
The lack of any significant difference in ratings is consistent with the result reported by Liegle and McDonald (2005) that used a relatively large sample. The lack of any significant differences in ratings and the direction of ratings reported in this study are different from the results reported by Recker and Greenwood (1995) and Thorpe (2002), discussed previously. We believe that the larger sample size used in this study provides a more reliable result than those reported by the other two studies.

**Hypothesis 3: overall effectiveness rating for faculty with high ratings**
Students’ responses for the question on the ‘overall effectiveness of the instructor’ were used to determine the equality of the ratings between the two methods for faculty who were rated above the college average in the paper-based method. There was a statistically significant difference between the ratings in the two survey methods \( p > |t| = 0.038 \). The difference between the two means indicated a decrease of 0.129 in student ratings in the web-based method.

**Hypothesis 4: effectiveness rating for faculty with low ratings**
This hypothesis was similar to hypothesis three except that it considered the equality of ratings between the two methods for faculty who were rated below the college mean in the paper-based method. The result of the \( t \)-test showed a statistically significant increase in the faculty rating in the web-based method \( p > |t| = 0.002 \). The difference in the means was 0.45.

This result about ratings of low-rated professors and the previous result regarding high-rated professors suggest that a factor other than the participation of low-attendance students might be involved. Perhaps, an environment without time pressure and in which the student rates a number of sections at the same time may be less conducive to the use of extremes in the rating. Perhaps, those students who are not part of a captive audience are more reflective and less extreme in their opinions.

**Hypothesis 5: proportion of respondents providing comments**
The chi-square test showed no statistically significant difference between the ratio of the number of students who provided qualitative responses to those who provided numerical responses \( pr <= p = 0.0019 \) in the two methods. This result suggests that students who participate in the survey of faculty teaching on the Web are likely to provide the same amount of feedback as those who participate in the paper-based method.

**Hypothesis 6: qualitative ratings**
The whole qualitative response for each student was rated as either positive, mixed or negative. The chi-square test showed no statistically significant differences between the two methods with respect to the number of students who gave a positive, mixed or a negative response. This result suggests no differences between the feedback students provide on their level of satisfaction with faculty teaching in the two methods.
Hypothesis 7: length of comments
We measured the length of a comment as the total word count of the student’s response. Only those students who did provide written comments were included. The $t$-test showed a statistically significant increase in the feedback length for the web-based method ($p > |t| = 0.0001$). This result confirms several authors’ expectations that students will provide longer feedback absent a limited time period for writing their comment.

Hypothesis 8: constructive responses
Hypothesis 8 states that the ratio of the number of constructive responses to the total number of responses is the same for both methods. As mentioned before, a response was considered constructive if it provided one or more specific statements about the student’s satisfaction or dissatisfaction with faculty teaching methods. The chi-square test showed no significant differences between the results of the paper-based survey and the web-based survey. The combination of results of Hypotheses 7 and 8 suggests that although students may provide longer responses, the responses are not necessarily more constructive. In other words, students used more words in the web-based method to convey the same type of feedback they provided in the paper-based method.

Hypothesis 9: number of constructive comments
This hypothesis states that the number of constructive comments in each student response is the same in the two methods. The purpose of this hypothesis was to determine if the responses in the web-based method included a larger number of constructive comments. Again, a distinction is made between a constructive response and a constructive comment. The whole qualitative response made by one student may be a constructive response and may include one or more constructive comments.

The chi-square test showed no significant differences between the numbers of constructive comments provided by students in the two methods. The results of Hypotheses 8 and 9 contradict the expectation stated in the literature that web-based feedback will be more thoughtful, especially if this term is measured in terms of offering constructive suggestions for improvement in faculty teaching.

Hypothesis 10: number of qualified constructive comment
This hypothesis states that the ratios of qualified constructive (a qualified constructive comment is a constructive comment for which students give a supporting rationale or reason.) and constructive (a comment for which students do not give a supporting rationale or reason) comments in each student response are the same in the two methods. The purpose of this hypothesis was to test the equality of the clarity and meaningfulness of student comments in the two methods.

The chi-square test showed a significant difference between the number of qualified constructive comments and constructive comments between the two methods. Students provided more qualified constructive comments in the web-based method than in the paper-based method. This confirms the expectations by some authors that students
will provide more meaningful feedback in the web-based method. The combination of the results of the tests of Hypotheses 7 and 10 indicate that students provide longer and more meaningful comments in the web-based method.

**Conclusions and suggestions for further research**

Currently, this paper presents the largest formal study comparing the results of student feedback between paper-based and web-based methods with respect to both quantitative and qualitative portions of student surveys. It complements the literature that is currently composed of a very small number of empirical studies that have used very small sample sizes in studying the quantitative section of surveys and contained no empirical studies on the qualitative section of the surveys. Another major contribution of this paper is proposing definitions that help in quantifying qualitative feedback so that formal statistical analysis could be performed on them.

The two major purposes of this study were to determine what kind of changes in the students’ feedback on faculty teaching should the faculty and administrators expect as universities make the transition from the paper-based to the web-based method of gathering the feedback. Generally, the results indicated that there were no differences in the quality of feedback between the two methods. The students’ ratings along the eight numerical questions, the type of feedback and the quality of feedback were not significantly different between the two methods.

However, the results indicated a significant decrease in the number of respondents. This result confirmed the literature, presented earlier, on this subject and should give pause to any institution that may be considering the transition from paper-based to web-based surveys. Faculty and administrators must use the results for individual course sections very carefully, especially for those sections that have a very small number of respondents. Sampling error effects may result in a section being rated too high or too low as the number of respondents for the section becomes smaller.

More accurate feedback for every section requires a larger number of respondents. Faculty and administrators would need to try ways of increasing the response rate. Several approaches have been suggested for increasing the response rate in the web-based method. Some suggest providing an incentive such as entering a campus-wide drawing or extra credits for courses for which students complete the surveys. Others suggest increasing the number of reminders from a variety of sources that may have influence over students, such as the office of student affairs, student organisations and the student senate.

To ensure the fairness of important personnel decisions, survey data from several sections of the courses the faculty has taught over a relatively long interval should be used. The larger body of data would hopefully present a better picture of faculty member’s teaching performance. In addition, in specific cases that a higher response rate is deemed necessary, faculty and administrators may agree on conducting paper-based surveys.
Identifying the effect of these stimuli on the response rate is an interesting and much needed subject of research. In addition, more research is necessary to determine the characteristics of those students who participate in completing surveys and the necessary type and level of stimuli that may make those who do not participate willing to participate.

The results confirmed the current literature’s expectation/prediction on the length of student qualitative responses. This paper formally tested this hypothesis and showed that students write longer qualitative responses on the Web. In addition, this paper used qualified constructive comments as a surrogate for meaningful comments and showed that students provide more qualified constructive comments through giving more explanation of their views and discussion of reasons for their suggestions in the web-based method. As a result, student comments are more meaningful in the web-based method. These results are very positive and should be promoted by university administrators and faculty.

However, this study did not confirm the expectation stated in the literature that students would provide more thoughtful responses in the web-based method. Measures of constructive responses (a response is constructive if it includes one or more constructive comments) and constructive comments (a specific technique or action for improving student learning) were used to gauge the thoughtfulness of student responses. Statistical results did not support any differences between the two methods for these items.

References


Hmieleski, K. (2000, June). Barriers to online evaluation. Troy, NY: Rensselaer Polytechnic Institute, Interactive and Distance Education Assessment (IDEA) Laboratory.


Appendix 1. Numerical part of student survey

<table>
<thead>
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<th>Unacceptable</th>
<th>Poor</th>
<th>Acceptable</th>
<th>Good</th>
<th>Very Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Rate the overall effectiveness of the instructor.
2. Rate the instructor’s ability to communicate ideas effectively.
3. Rate the instructor’s consistency/punctuality meeting class and using allotted time.
4. Rate the instructor’s helpfulness/sensitivity/responsiveness to all students’ needs.
5. Rate the overall quality of the course.
6. Rate how much you have learned or benefited from the course.
7. Rate this course on organization, structure, and clarity of requirements.
8. Rate how well the instructor was prepared for each class.

Appendix 2. Qualitative part of student survey

Comment Sheet
Course Evaluation

Instructor: Semester:
Course: Call Number:

PLEASE PROVIDE COMMENTS ON INSTRUCTOR, CLASSROOM, FACILITY, INSTRUCTIONAL MATERIALS, THE COURSE AND OTHER CONCERNS.